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	Explosives UNEXPLODED ORDNANCE (UXO) SUPPORT DURING HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) AND CONSTRUCTION ACTIVITIES	
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20 November 2000

US Army Corps of Engineers®

EXPLOSIVES

UNEXPLODED ORDNANCE (UXO) SUPPORT DURING HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) AND CONSTRUCTION ACTIVITIES

ENGINEER PAMPHLET

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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

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HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) AND CONSTRUCTION ACTIVITIES

1. Purpose. This pamphlet provides U.S. Army Corps of Engineers (USACE) personnel with procedural guidance, technical specifications, personnel and training requirements, and health and safety criteria for UXO support during HTRW and construction activities.

2. Applicability. This pamphlet applies to all Headquarters, U.S. Army Corps of Engineers (HQUSACE) elements, USACE Major Subordinate Commands (MSCs), USACE Geographic Districts (districts), and field operating activities having responsibilities for civil works and/or military programs with HTRW-related and construction projects that have the potential for encountering UXO. The UXO support requirements presented in this pamphlet are applicable to anomaly avoidance activities conducted during the investigative/design and remediation/ construction phases of projects on sites with known or suspected UXO. Although the procedures for anomaly avoidance presented in this pamphlet pertain to HTRW-related activities, these procedures may be modified to address other types of activities, as appropriate. Guidance presented in this pamphlet is consistent with policy to be published in ER 385-l-95. Contact the OE MCX for additional information.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References. Required and related references are at Appendix A.

5. Explanation of Abbreviations and Terms. Abbreviations/acronyms and special terms used in this pamphlet are explained in the glossary.

FOR THE COMMANDER:

Milton Hunter

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DEPARTMENT OF THE ARMY
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CHAPTER 1
INTRODUCTION

1-1. General. This Engineer Pamphlet (EP) presents procedures for providing UXO support during HTRW and construction activities. The EP will introduce the different requirements for providing UXO support during the investigative/design phase and remediation/construction phase of projects on sites with known or suspected UXO.

a. During the investigative/design phase of any project on a site with known or suspected UXO, UXO support refers to the anomaly avoidance techniques implemented to avoid any potential surface UXO and any subsurface anomalies. USACE primarily implements anomaly avoidance procedures on HTRW sites. Intrusive anomaly investigation is not authorized during anomaly avoidance activities. Although the examples of anomaly avoidance techniques in this EP pertain to HTRW-related activities, the procedures may be modified to address other types of activities, as appropriate. For additional information on anomaly avoidance techniques, contact the OE MCX.

b. UXO support during construction activities, including the remediation phase of an HTRW project, on a site with known or suspected UXO may include only UXO safety support or may require a complete subsurface clearance response. The level of UXO support required during construction activities is dependent on the probability of encountering UXO.

(1) If the probability of encountering UXO is low (e.g., current or previous land use leads to an initial determination that UXO may be present), only UXO safety support will be required. UXO safety support is discussed in paragraph 6-5 of this document.

(2) When a determination is made that the probability of encountering UXO is moderate to high (e.g., current or previous land use leads to a determination that OE was employed or disposed of in the area of concern), UXO qualified personnel must conduct a subsurface clearance of the known construction footprint and remove all discovered UXO.

(3) The level of effort for construction support is site/task-specific and will be determined on a case-by-case basis by the project team in coordination with the Ordnance and Explosives (OE) Mandatory Center of Expertise (MCX).

c. If UXO is encountered after initiation of an HTRW or construction project, the procedures to be published in ER 385-1-95 may apply. Contact the OE MCX for guidance and assistance.

d. The OE MCX will determine procedures for sampling and cleanup of soils contaminated with primary explosives on a case-by-case basis. The HTRW Design District is responsible for the design and removal or remedial action to clean up soils contaminated with

secondary explosives; however, where military munitions (excluding bulk explosives) are suspected or known to exist, the appropriate OE Design Center is responsible for the design, and the appropriate OE Design Center or the district approved to execute OE removal actions is responsible for the cleanup.

1-2. Responsibilities.

a. It is the responsibility of all USACE personnel involved with the OE Program to safely execute OE response projects, including UXO support during HTRW and construction activities, in accordance with applicable laws, regulations, and policies. A detailed discussion of USACE organizational responsibilities for OE response projects is presented in Engineer Regulation (ER) 1110-1-8153, Ordnance and Explosives Response.

b. All USACE organizations will ensure that all personnel with access to the site for UXO support during HTRW and construction activities are familiar with, and have access to, copies of the accepted Work Plan and Site Safety and Health Plan (SSHP). In addition, each organization will ensure that such personnel receive the appropriate training, medical surveillance, and personal protective equipment (PPE) required by the safety plan, contract specifications, Occupational Safety and Health Administration (OSHA) Standards, USACE regulations, and applicable Department of Defense (DOD) and Department of Army (DA) regulations.

1-3. Functional Roles. The following section provides a description of the functional roles for UXO support activities. A more comprehensive description of the functional roles for the organizations discussed below is also provided in ER 1110-1-8153.

a. Headquarters, US Army Corps of Engineers. If an explosives safety submission (ESS) is required for UXO support activities, it will be reviewed and approved by HQUSACE.

b. Major Subordinate Command. If an ESS is required for UXO support activities, it will be monitored by an MSC in accordance with ER 1110-1-8153.

c. District. A district will:

(1) Execute UXO support activities.

(2) Assign a Project Manager (PM) to lead the project team, coordinate all project activities, serve as a liaison with other stakeholders, and review/approve project documents as required.

(3) Conduct UXO support activities with either in-house resources or by contract.

(4) Coordinate the UXO support project with the OE MCX.

(5) Prepare a project-specific Statement of Work (SOW) and Independent Government Estimate (IGE) for UXO support activities.

(6) Submit plans developed for UXO support activities to the OE MCX. All OE concerns will be addressed before initiating any on-site activities.

(7) If an ESS is required, review and provide comments and written concurrence or nonconcurrence.

(8) Supervise the fieldwork. UXO operations will be supervised by UXO qualified personnel.

(9) Conduct appropriate quality verification activities.

(10) Coordinate requests for support from the 52nd Ordnance Group (EOD) with the OE MCX.

d. OE Design Center. If an ESS is required for planned UXO support activities at a site, the appropriate OE Design Center will ensure its proper planning and preparation.

e. OE MCX. The OE MCX will:

(1) Review and provide comments and written concurrence or non-concurrence on UXO support-related products (e.g., SOW, Work Plan, and ESS) to ensure compliance with federal, DOD, DA, and USACE OE safety and OE environmental regulations.

(2) Provide OE technical support to any USACE office conducting construction and/or HTRW operations in areas where UXO is suspected or known to exist.

(3) Develop and/or approve OE-specific contract requirements, including OE contractor personnel qualifications and work standards, for contract acquisition.

(4) Assimilate and analyze lessons learned from UXO support projects and provide them to the HTRW MCX for inclusion in the USACE lessons learned database.

(5) Coordinate the 52nd Ordnance Group support in accordance with the Memorandum of Agreement (MOA) between the U.S. Army Engineering and Support Center, Huntsville (USAESCH) and 52nd Ordnance group.

f. OE Safety Specialist. If a subsurface clearance response is being conducted in support of construction activities, an OE Safety Specialist will be present to provide safety oversight. Otherwise, an OE Safety Specialist is generally not required on-site. Additional information is available in ER 1110-1-8153.

g. U.S. Army 52nd Ordnance Group. The Group will respond to requests for assistance in accordance with its MOA with USAESCH.

CHAPTER 2
STATEMENT OF WORK/INDEPENDENT GOVERNMENT ESTIMATES

2-1. Introduction. This chapter provides guidance on preparing a SOW and IGE for UXO support during HTRW and construction activities. The district is responsible for executing the SOW and IGE for UXO support activities.

2-2. Statement of Work.

a. General. Project safety and health are overriding parameters of OE project design and execution. The OE MCX safety personnel are points-of-contact (POC) for UXO safety issues and have particular, specialized expertise in identifying, interpreting and implementing applicable safety requirements for OE projects. Each SOW for UXO support activities must be closely coordinated with these personnel.

b. Preparation.

(1) The PM is responsible for preparing the SOW for UXO support activities required in conjunction with HTRW or construction activities. The OE MCX may be consulted to provide the appropriate statements or paragraphs concerning background and authority for the task order or contract award.

(2) Appendix B provides an example SOW for UXO support during HTRW investigative activities on sites with known or suspected UXO. Appendix C provides an example SOW for UXO support during construction activities on sites with known or suspected UXO. The appropriate UXO support SOW may be used as an addendum to a larger SOW for an existing project.

(3) The examples provided in Appendices B and C should be followed to ensure that the applicable requirements (i.e., site visit, Work Plan preparation, UXO support procedures, quality control, reporting, and public affairs assistance) are included. The OE MCX should assist in the drafting of SOW verbiage when UXO support is required for HTRW activities not specifically referenced in Appendix B or when construction activities other than those presented in Appendix C are proposed and UXO support is required.

(4) Neither of these examples contains provisions for a records search by the contractor to determine what types of UXO might be encountered. Districts should consider completing a records search to determine the potential for contact with UXO and the potential types and quantities before using the SOW in Appendix B or C.

c. Review Process. Following the preparation of the SOW, the PM should submit copies to the OE MCX for review. The OE MCX will provide comments and written concurrence or

nonconcurrence for the decision/approval authority. The OE MCX will be allowed 15 calendar days from receipt of the SOW for this review. If no comments are received within this time frame, concurrence may be assumed by the executing agency.

2-3. Preparation of the IGE. Once the SOW is prepared, an IGE for UXO support during HTRW or construction activities is prepared. In preparing cost estimates for UXO support projects, the government cost estimator or project engineer must first consider the intent of the cost estimate in order to select the best cost-estimating tool.

a. If the objective is to estimate an order of magnitude cost for budgetary purposes, then a parametric model is used to provide costs for various phases of the project. The recommended USACE software program is the Remedial Action Cost Engineering and Requirements System (RACER).

b. If the objective is to provide a detailed independent cost estimate to be used as the basis for negotiation for a stand-alone contract or individual task orders under a particular indefinite delivery order (IDO) contract, then a detailed cost estimate is required. The structure of the cost estimate will vary depending on the contract type. The recommended USACE software programs for detailed estimates are Micro Computer-Aided Cost Engineering System (MCACES) Gold Version 5.3, MCACES for Windows, Lotus 123™ spreadsheets, or Excel™ spreadsheets. The cost estimator or project engineer may develop crew and productivity sheets for the various field activities or tasks in the SOW to determine the duration or number of hours for the various labor categories needed to support each task. The labor rates are burdened rates and reflect all contractor mark-ups. Materials and travel and per diem are duration driven and totaled separately from the labor. The materials estimated can be purchased, rented, or allocated to overhead.

CHAPTER 3
PLANNING CONSIDERATIONS FOR UXO SUPPORT

3-1. Introduction. This chapter discusses the requirements that should be addressed prior to initiating UXO support activities during HTRW and construction activities on sites with known or suspected UXO. The objective of UXO support activities is to conduct safe and efficient operations while limiting potential exposure to a minimum number of personnel for a minimum time and to the minimum amount of UXO.

3-2. Planning Documents. Site-specific planning documents should be prepared that will detail the methodologies that will be used during the UXO support project. For anomaly avoidance activities, the planning document is the HTRW Work Plan. For construction activities, the planning documents include the Work Plan and the ESS (if required). For range construction projects, the planning documents include Plans and Specifications. The planning documents should be prepared in accordance with the project SOW and contract requirements. The project team should ensure that these documents are consistent with each other.

3-3. Work Plan.

a. For anomaly avoidance and construction activities, a Work Plan to supplement the prime contractor's or USACE work plan/site plan will be prepared. The Work Plan should be prepared in accordance with the project SOW and contract requirements.

b. Content. The Work Plan does not need to be comprehensive, as it is a supplement to the overall site Work Plan. The Work Plan should detail the management approach and operational procedures that will be used to complete the UXO support activity. The Work Plan should include a SSHP which specifically addresses UXO considerations. The Work Plan should indicate the specific geophysical instrument the UXO team intends to use.

c. The Work Plan should be submitted by the contractor to the PM for review and comment. The PM will then forward one copy to the OE MCX. The OE MCX will review and provide comments and written concurrence or nonconcurrence on the planning documents containing UXO support provisions. The OE MCX will be allocated 15 calendar days from date of receipt for this review. If no comments are received from the OE MCX within this time frame, concurrence may be assumed by the executing agency.

d. The accepted Work Plan will serve as the contractual basis for all subsequent project activities. Current copies of the Work Plan will be kept for reference by the PM, the contractor's senior site representative and safety manager, and the UXO team. The accepted Work Plan will be maintained in the district office.

e. Modifications. Changes may be required to the Work Plan and/or SSHP after approval by the Contracting Officer. A modification that affects any UXO subsurface clearance operational and/or safety procedures may also require a revision to and re-submittal of the Explosives Siting Plan.

3-4. Explosives Siting Plan.

a. General.

(1) An Explosives Siting Plan (ESP), a component of the Work Plan, is prepared for UXO support during construction activities. The ESP discusses the proposed minimum separation distances for unintentional detonations, intentional detonations, and siting of critical project components. The ESP should describe the basis of design, all design calculations, and proposed hazard mitigation measures to be implemented to protect the public, non-project personnel, and site workers from explosive hazards. The ESP will be reviewed by the project team to ensure that the appropriate minimum separation distance criteria have been applied.

(2) The ESP will discuss the following explosives operations: OE areas, explosives storage magazines, and planned or established demolition areas. The location of these explosives operations will be sited on a map with a minimum scale of 1 inch equals 400 feet. The minimum separation distances calculated for the operation should be discussed in the text of the plan and Quantity-Distance (Q-D) arcs for the above-listed project elements drawn on the map.

(3) Quantity-Distance. Explosives safety distance tables prescribe the necessary separations and specify the maximum quantities for various classes of explosives permitted in any one location. The Q-D tables provided in DOD 6055.9-STD, DOD Ammunition and Explosives Standards, reflect the acceptable minimum criteria for the storage and handling of various classes and amounts of explosives. These distances will be used for siting storage locations. The project should site Open Burn/Open Detonation (OB/OD) areas in accordance with EP 1110-1-17, Establishing a Temporary Open Burn and Open Detonation Site for Conventional Ordnance and Explosives Projects.

b. OE Areas. During intrusive operations, safe separation distances will be determined using two sets of minimum separation distance criteria. The first set of criteria has been established for unintentional detonations (i.e., not planned in advance) and the second set of criteria has been established for intentional detonations (i.e., planned, controlled detonations). Details on calculating minimum separation distances are published in Engineer Manual (EM) 1110-1-4009, Ordnance and Explosives Response.

(1) Unintentional detonations. For an unintentional detonation, the applicable minimum separation distances are the minimum separation distances for unintentional detonations and the team separation distance (TSD). The minimum separation distance for unintentional detonations

is the safe separation distance for non-project personnel from intrusive operations. The TSD is the distance that UXO teams must be separated during intrusive operations.

(2) Intentional Detonations. The minimum separation distance for intentional detonations is the distance that both project personnel and the public must be from the intentional detonation.

c. Explosives Storage Magazines.

(1) The ESP should provide the following information on explosives storage magazines:

(a) Type(s) of magazines used (e.g., Bureau of Alcohol, Tobacco and Firearms Classification [Type 1-5], portable commercial, above ground, shed, earth covered, etc.).

(b) Net Explosive Weight (NEW) and hazard division to be stored in each magazine. Generally, recovered OE is considered Hazard Division (HD) 1.1.

(c) Q-D criteria used to site the magazine.

(d) Design criteria for any proposed engineering controls to be used to mitigate exposures to the public when Q-D criteria cannot be met.

(2) Magazines must also be properly placarded and the property must be secured. DOD magazines storing commercial explosives must have the appropriate fire fighting symbol or locally required DOD Hazard Classification and Storage Compatibility Group assigned.

d. Planned or Established Demolition Areas. The safe separation distance for these areas will be based on the minimum separation distance criteria for intentional detonations.

e. Footprint Areas. The following footprint areas should be discussed in the ESP: blow-in-place, collection points, and in-grid consolidated shots. These areas, however, do not have to be shown on the site map. The safe separation distances for these footprint areas are described in the following paragraphs.

(1) Blow-in-Place. Blow-in-place is the preferred method for disposal of UXO. Blow-in-place occurs when a UXO item is prepared and detonated in-place. The safe separation distances for blow-in-place areas will be determined using the minimum separation distance criteria for intentional detonations.

(2) Collection Points. Collection points are areas where recovered UXO that is safe to move is temporarily accumulated within a search grid pending relocation to another area for storage or destruction. Collection points should be limited to the amount of explosives such that the K50 total of the rounds to be destroyed will not exceed safe separation distances. The safe

separation distances for collection points will be determined using the minimum separation distance criteria for unintentional detonations.

(3) In-Grid Consolidated Shots. In-grid consolidated shots occur when recovered UXO that is safe to relocate is collected and destroyed within a search grid. In contrast to an established demolition ground, consolidated shots occur within a search grid rather than in a separate area. The procedures for in-grid consolidated shots are presented in the USAESCH document "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites", dated August 1998. USAESCH documents are available on the OE MCX website at http://www.hnd.usace.army.mil/oew.

f. Exceptions. The calculated minimum separation distances for unintentional detonations specified above are considered minimums for safe execution of normal operations. When site conditions exist that make it impossible or impractical to comply with these minimums, the PM may request consideration of a possible reduction. Any request for a reduction of these minimum separation distances will be funded and staffed through the Huntsville Center's Engineering Directorate, Structural Branch for calculations and the Huntsville Center's OE Safety Group for approval. For any requested reduction to the specified minimum separation distances for unintentional detonations, a detailed risk analysis must be documented explaining why these reductions are necessary and acceptable.

3-5. Explosives Safety Submission.

a. Construction activities involving the removal and disposition of UXO may require submittal and approval of an ESS. The requirement for an ESS will be determined on a case-by-case basis by the project team in consultation with the OE MCX. The purpose of the ESS is to ensure that all applicable DOD and Army regulations regarding safe and secure handling of ordnance are followed. Detailed information on the content, review and approval procedures, and modification process for the ESS is available in EP 1110-1-18.

b. UXO removal operations may not begin on construction projects requiring an ESS until the ESS is approved by the U.S. Army Technical Center for Explosives Safety (USATCES) or Department of Defense Explosives Safety Board (DDESB) and the contractor has been directed to incorporate the accepted ESS into the Work Plan. A copy of the accepted ESS will be maintained at the project site. All operations will be executed in accordance with the accepted ESS.

c. When an element of the accepted ESS changes, the ESS must be amended. The contractor will prepare the proposed change and forward it to the PM, who will forward it to the OE MCX for review. The OE MCX will forward the proposed changes to the appropriate agency for approval. For a change that specifies less restrictive requirements (e.g., reduction in exclusion zone), the contractor will comply with the accepted ESS until the change is approved.

When changes would be more restrictive (e.g., increase in exclusion zone), the contractor will apply the more restrictive measures until the ESS change is approved.

d. Once the ESS, Work Plan and all other prerequisite planning documents are accepted, a Notice-to-Proceed with the removal operations will be issued.

3-6. Personnel Qualifications and Work Standards. The OE MCX has set forth personnel standards applicable to all USACE OE Safety Specialists and UXO contractor personnel working for the USACE. These qualifications and standards detail the prerequisites for education and experience required for UXO personnel and are available on the OE MCX website at http://www.hnd.usace.army.mil/oew.

3-7. Training. USACE and contractor personnel will be in compliance with training requirements prior to conducting UXO support activities. Training requirements are published in EP 1110-1-18. The training topics included in EP 1110-1-18 pertain to 29 Code of Federal Regulations (CFR) 1910, 29 CFR 1926, cardiopulmonary resuscitation (CPR)/First Aid, Medical Surveillance, and Visitor Training.

3-8. Explosives Safety. There are no “safe” methods for dealing with UXO, merely procedures and process controls that are designed to reduce potential hazards. Maximum safety in any UXO response can be achieved through adherence to applicable safety precautions, a planned approach, and intensive supervision and UXO safety oversight. UXO qualified personnel will conduct a UXO-related site safety briefing prior to commencing operational activities each workday. All activities with potential exposure to ordnance and explosives will be reviewed to identify the associated risks and proposed mitigation procedures. Operations within areas suspected of containing UXO must be conducted in a manner that exposes the minimum number of people to the smallest quantity of explosives for the shortest period of time. During UXO subsurface clearance actions, all non-essential project personnel will withdraw to a location outside of the exclusion zone.

a. General Safety Considerations. General safety considerations applicable to personnel, both essential and non-essential, at project sites where UXO may be encountered include:

(1) Do not carry fire or spark-producing devices.

(2) Do not conduct explosive or explosive-related operations without approved procedures and proper supervision and UXO safety support.

(3) Do not become careless by reason of familiarity with UXO or the reported probability level of UXO contamination.

(4) Do not conduct explosive or potentially explosive operations during inclement weather.

(5) Avoid contact with UXO except during UXO clearance conducted during construction activities.

(6) Conduct UXO-related operations during daylight hours only.

(7) Employ the “buddy system” at all times.

b. Hazard Analysis.

(1) Hazard analyses will be conducted by personnel that are knowledgeable in UXO and explosives safety standards and requirements. These personnel should understand the specific operational requirement and hazard analysis methodologies. A hazard analysis will be performed for each activity to determine the significance of any potential explosive-related hazards. For example, residual explosives from ordnance fillers may be exposed during an HTRW sampling activity. Explosive residues may be in the form of powder or various granular and powder based pellets. These contaminants can enter the body through the skin or by ingestion if proper personal hygiene practices are not followed. Explosive fillers such as white phosphorus are dangerously reactive in air and acute exposure can result in serious injury to the skin, eyes, and mucous membranes. They are also a fire hazard.

(2) Safety requirements (or alternatives) that will either eliminate the identified hazards or control them to reduce the associated risks to an acceptable level will be developed. The adequacy of the operational and support procedures that will be implemented to eliminate, control, or abate identified hazards or risks will then be evaluated and a second risk assessment completed to verify that a satisfactory safety level has been achieved.

c. Hazards of Electromagnetic Radiation to Ordnance (HERO).

(1) Some ordnance items and other electroexplosive devices (EEDs) are particularly susceptible to electromagnetic radiation (EMR) in the radio frequency range (RF) originating from devices such as radio, radar, and television transmitters. The presence of antennas, communication and radar devices should be noted on initial site visits and/or preliminary assessments of eligibility. In addition, active and passive subsurface detection devices emit EMR/RF. Each type of equipment producing EMR/RF must be reviewed and a hazard analysis completed. The level of EMR/RF susceptibility and potential hazard is a result of the design and type of ordnance item or EED that may be present. Therefore, a knowledge of what ordnance is normally unsafe in the presence of EMR/RF is important so preventive steps can be taken if the ordnance is encountered. The OE MCX should be consulted when geophysical investigations are planned in areas potentially containing electric-fuzed ordnance.

(2) As part of the hazard analysis, the minimum separation distance between an EMR/RF emitting device and potential EEDs will be calculated. This calculation is based on the

characteristics of the transmitting device and the potential EEDs. The important characteristics of the EMR/RF source device are:

(a) The transmitter frequency (f, in MHz).

(b) The peak envelope transmitting power (Pt, in W).

(c) The transmitter gain (GdB).

(3) Minimum safe distances from EMR/RF sources are listed in Tables 2-2, 2-3, and 2-4 of Technical Manual (TM) 9-1375-213-12, Operator's and Organizational Maintenance Manual, Demolition Materials.

3-9. Personal Protective Equipment.

a. All UXO team members should be trained in the use of, medically qualified for, and physically able to wear, the prescribed PPE. PPE for UXO support operations will be determined by site-specific and task-specific analyses, documented in the site-specific SSHP, and worn as indicated in the plans. Specific requirements for PPE are described in the following paragraphs.

(1) PPE will comply with the more stringent requirements of EM 385-1-1, USACE Safety and Health Requirements Manual, and the applicable portions of 29 CFR 1910 Subpart I or 29 CFR 1926 Subpart E.

(2) Footwear. In addition to the applicable requirements in the references cited above, shoes or boots with high traction soles and ankle protection will be used. During geophysical detection activities, UXO support personnel will not wear safety shoes or other footwear that would cause interference with instrument operations.

(3) Clothing. Short sleeve shirts and long pants are considered the minimum clothing suitable for UXO support work and will be worn at all work sites, unless variations are described, analyzed and documented in the accepted SSHP.

(4) Head Protection. Personnel working in or visiting designated hard hat areas will be required to wear head protection meeting American National Standards Institute (ANSI) Z89.1 standards. Hard hat areas for UXO support activities should not be designated unless the activity hazard analysis shows a possible overhead hazard.

b. UXO support personnel using PPE will be knowledgeable of the limitations of the selected PPE as well as the reduced performance levels the equipment might pose while conducting assigned tasks.

3-10. Fire Prevention.

a. Fire prevention awareness is especially important in areas suspected of being contaminated with UXO. Smoking should only be permitted in controlled areas where all combustibles (e.g., vegetation, fuel cans, sampling supplies) have been removed or sufficient firebreaks have been established. Personnel may attempt to extinguish minor fires with fire extinguishers if they are trained to do so safely without endangering themselves or others within the vicinity of the fire.

b. If a fire becomes uncontrollable or extends into areas with unknown UXO contamination, all personnel must immediately suspend any fire fighting efforts and retreat to a safe distance, which is at least the maximum fragment distance of the most probable munition (MPM). Personnel should retreat upwind of the fire. The senior UXO qualified person present should then lead an immediate evacuation of the area using available resources to ensure the safety of all personnel.

3-11. Emergency Procedures. UXO support activities may result in accidents or incidents, regardless of the safeguards implemented. The SSHP will describe site-specific emergency response procedures, including identification of all appropriate POCs. All personnel must be briefed on the emergency response procedures and protocols discussed in the SSHP.

a. Emergency Response. In the event of a UXO-related emergency on-site during anomaly avoidance, the senior UXO qualified person present will direct the course of action until the local POC designated in the Work Plan has been notified. In the event of a UXO-related emergency on-site during construction support, the Senior UXO Supervisor (SUXOS) will direct the course of action until the local POC designated in the Work Plan has been notified. It may be necessary for other on-site personnel to provide assistance. If an emergency response rescue operation is required, no one will reenter the accident area until the hazards of the situation have been assessed by the responsible person (see above), and all required resources are on-hand to complete the rescue without jeopardizing the safety of rescue personnel.

b. Emergency Rescue.

(1) The senior UXO qualified person or the local POC, as applicable, will direct any UXO-related emergency response rescue operation. Response considerations include the following elements:

(a) Designation of an emergency response vehicle(s) to remain on-site during rescue operations.

(b) Determination of existing hazards, as well as the potential for additional hazards.

(c) Coordination with USACE in the review of the need to alert the local community.

(d) Assessment of the situation and condition of any victims.

(e) Determination of the resources needed for victim stabilization and transport and additional emergency support.

(f) Enforcement of the Buddy System. No one will be permitted to enter a rescue area alone.

(g) Oversight of the removal of injured personnel from the area.

(h) Consultation with on-site safety officers to establish decontamination protocols. Decontamination of injured parties will be accomplished after stabilization of their medical conditions. This action need not be accomplished if their condition poses immediate threat to the victim's life or may cause additional injury. If contamination is suspected, the victim will be wrapped in material to prevent the spread of contamination during extrication and transport. Emergency medical personnel will be advised on potential injuries, as well as potential contamination, of the patient as early as possible. The patient will not be transported to a medical facility without prior notification of, and coordination with, the receiving facility regarding potential contamination.

c. Mishap Reporting and Investigation Requirements. The following information provides guidelines to be followed for reporting mishaps involving ammunition and explosives on UXO support projects. Site-specific reporting and investigation procedures, including identification of appropriate POCs, will be included in the SSHP.

(1) Reporting Requirements. All mishaps will be investigated by the contractor and reported to the Contracting Officer and OE Safety Specialist or to the government authority cited in the SOW. Notification and reporting of mishaps will be in accordance with USACE Supplement to Army Regulation (AR) 385-40, USAESCH Safety Concepts and Basic Considerations for UXO Operations, and EM 385-1-1. Any mishap will be reported on ENG FORM 3394, Accident Investigation Report.

(a) For anomaly avoidance and safety support projects on Formerly Used Defense Sites (FUDS), the senior UXO-qualified person on-site is responsible for mishap reporting. For subsurface clearance projects in support of construction activities at FUDS, the contractor’s UXO Safety Officer (UXOSO) is responsible for mishap reporting. For contracts under the supervision of the district, mishaps will be reported to the district safety office. An information copy of the accident report will be forwarded to the OE MCX. USACE district personnel will report through Command channels to the HQUSACE Safety and Occupational Health Office.

(b) On active installations, the installation safety officer is responsible for reporting any explosive mishaps.

(c) Non-Stockpile Chemical Warfare Materiel (CWM) Incidents. Incidents involving CWM will be reported in accordance with USACE Supplement to AR 385-40. A site-specific POC will be identified and documented in accordance with the reporting requirements in paragraph 3-11c(1).

(2) Investigation Requirements. In the event of a mishap, the contractor will implement emergency procedures and secure the scene to keep unauthorized persons away for their protection and to preserve the evidence for subsequent mishap investigation. On active installations, the U.S. Army Safety Center (USASC) maintains the prerogative to investigate Class A or Class B explosive mishaps (as defined in AR 385-40). If USASC chooses to investigate, it is the lead agency. If USASC chooses not to investigate, then the district is the lead agency.

CHAPTER 4
GEOPHYSICAL DETECTION EQUIPMENT

4-1. Introduction. This chapter presents an overview of available geophysical detection systems, their capabilities and limitations. There are many techniques beyond those mentioned in this chapter that have application to the detection of surface and subsurface UXO. No single detection system can effectively detect all types of munitions at all locations and depths.

4-2. Factors to Consider.

a. When selecting a geophysical survey instrument for detection of subsurface UXO, it is necessary to consider the maximum possible depth of UXO. If UXO is intentionally buried, factors affecting burial depth may include type of soil, mechanical vs. hand-excavation, depth of water table, etc. If the munition was fired or dropped, then the depth of penetration can be estimated by considering soil type, munition type and weight, and impact velocity. There are many cases where UXO can penetrate deeper than geophysical instruments can currently reliably detect. On such sites, it is possible that undetected UXO remains deeper than it can be detected.

b. Geophysical detection equipment used to locate subsurface UXO for avoidance or removal is seldom 100 percent effective. In many cases, a UXO may simply be located too deep, may be too small to be detected, or may be constructed of a material difficult to detect. Since the total number of subsurface UXO at a site is almost never known, complete detection cannot be documented. In addition, most commonly used geophysical survey systems will not detect subsurface bulk explosives. These factors must be considered when designing and implementing a UXO support response. If subsurface bulk explosives are anticipated based on archival data, then special avoidance techniques must be developed and increased safety precautions employed. Contact the OE MCX for additional information. The limitations of detection capabilities must be conveyed to all on-site personnel so that there is a common understanding of expectations.

4-3. Types of Instrumentation. The most successful UXO detection systems rely on one of two technologies: magnetometry or electromagnetics. Magnetometers are limited to detecting ferrous items. Electromagnetic detectors can detect any conductive metal.

a. Magnetometry.

(1) Magnetometers were one of the first tools used for locating buried munitions and remain one of the best. Most bombs and gun shells contain iron that causes a disturbance in the Earth's geomagnetic field. As the munitions are illuminated by the Earth's primary magnetic field, a secondary magnetic field results which magnetometers detect. Some magnetometers, which are called gradiometers, use two magnetic sensors configured to measure the slope (difference over a fixed distance) of the magnetic field, rather than the absolute magnetic field. Magnetometers are extremely sensitive and capable of identifying small anomalies. They

respond only to ferro-magnetic metals. In addition, magnetometers are sensitive to many iron-bearing minerals and "hot-rocks".

(2) Magnetometry will not detect subsurface bulk explosives. If subsurface bulk explosives are anticipated based on the site history, increased safety precautions and special techniques will be employed. Contact the OE MCX for additional information.

(3) Two types of magnetometers and gradiometers are most often used to detect buried munitions: fluxgate magnetometers and optically pumped atomic magnetometers.

(a) Fluxgate Magnetometers. Fluxgate magnetometers measure the magnitude and direction of a magnetic field. They are inexpensive, reliable, rugged, and have low energy consumption. Fluxgate magnetometers have long been a standard tool of EOD teams used for a quick, inexpensive field reconnaissance of a site containing ferrous munitions. However, most fluxgate magnetometers provide analog rather than digital output that makes it difficult to apply computer enhancement techniques.

(b) Optically Pumped Atomic Magnetometers. Optically pumped atomic magnetometers (also called atomic magnetometers or cesium-vapor magnetometers), also measure the magnitude and direction of a magnetic field. They utilize digital technology and are more expensive to purchase than fluxgate instruments. However, their high sensitivity, speed of operation, and high quality digital signal output make them a good choice for situations where data or digital post-processing is required.

b. Electromagnetic Detectors.

(1) Electromagnetic induction geophysical instruments are also extensively used to detect buried munitions. They differ from magnetometers in that they are not limited to detecting ferrous items; they can detect any conductive metal. In addition, electromagnetic detectors are not affected by most of the iron-bearing "hot rocks" that adversely affect magnetometers.

(2) There are numerous types of conductivity meters available. However, two types are most commonly used in the search for UXO: frequency-domain electromagnetics and time domain electromagnetic conductivity.

(a) Frequency Domain Electromagnetics. Frequency domain electromagnetic (FDEM) instruments can be useful for detecting large buried caches of munitions and detecting disturbed earth associated with pits and trenches. In addition, some types of FDEM instruments are the best geophysical tools available for detecting very small, very close objects such as the metal firing pins in plastic land mines buried just beneath the ground surface. However, since the resolution ability decreases dramatically with depth, frequency domain conductivity meters are not optimum for detecting individual, deeply buried munitions. Most commercial coin detectors are frequency domain conductivity meters.

(b) Time Domain Conductivity Electromagnetics. Time domain conductivity electromagnetic (TDEM) instruments provide an excellent compromise between detection depth and resolution. These instruments provide a capability to locate all types of metallic munitions and will see typical intact munitions to depths of one to two meters.

4-4. Geophysical Investigation Performance.

a. General. The performance of UXO detection instruments varies as a result of different site characteristics such as soil type, moisture content, depth to groundwater, vegetation, and type of UXO. The number of environmental and UXO factors affecting the performance of UXO detection instruments are so numerous that a test of various potential UXO detection instruments should be performed on the site to determine which instrument performs the best.

b. Performance Goals. Geophysical investigation performance goals will be included in the contractor's SOW. The most current contract requirements for geophysical investigation planning are found in the OE MCX Data Item Description "Geophysical Investigation Plan", which can be found on the OE MCX website at http://www.hnd.usace.army.mil/oew. If the contractor believes that these performance goals cannot be achieved at the site, then the contractor shall propose and document alternative goals for the Contracting Officer's consideration.

c. Horizontal Accuracy. Horizontally, 95 percent of all excavated items must lie within a 10 centimeter radius of their mapped surface location as marked in the field after reacquisition; 98 percent of all excavated items must lie within a 20 centimeter radius.

d. False Positives. There will be no more than 15 percent "false positives" where anomalies reacquired by the contractor result in no detectable, metallic material during excavations.

4-5. Test Plot. The Contracting Officer may require that the contractor demonstrate and document the capabilities of the proposed geophysical equipment. When the Contracting Officer requires a site-specific geophysical prove-out, a Work Plan that includes the test plot design will be prepared and implemented.

4-6. Calibration. Prior to use in the field each day, geophysical instrumentation will be checked for operational reliability and calibration against an item with a known response. Copies of instrument checkout and calibration verification will be maintained on-site. If calibration checks indicate that the instrument is not operating within an acceptable range and field adjustments do not resolve the discrepancy, the instrument will be immediately tagged and removed from service.

4-7. Maintenance. Preventative maintenance will be performed on a regularly scheduled basis. If an equipment problem is encountered, maintenance will be performed as soon as possible and records of the unscheduled maintenance and corrective action will be maintained and will indicate equipment identification, problem description, corrective action, the person performing the maintenance, and associated costs.

CHAPTER 5
ANOMALY AVOIDANCE PROCEDURES DURING HTRW ACTIVITIES

5-1. Introduction.

a. This chapter discusses anomaly avoidance procedures during the investigative/design phase of any project on a site with known or suspected UXO. USACE primarily implements anomaly avoidance procedures on HTRW sites with the potential to encounter UXO. HTRW-related activities during the investigative/design phases with the potential for encountering UXO include, but are not limited to, surveying and mapping, environmental and natural resource assessments, surface and subsurface sampling, boring and drilling, and groundwater monitoring.

b. The purpose of anomaly avoidance during HTRW activities is to avoid any potential surface UXO and subsurface anomalies during sampling activities. Intrusive anomaly investigation is not authorized during anomaly avoidance operations. Procedures for addressing explosives contaminated soils are addressed in paragraph 1-1d of this pamphlet.

5-2. Team Composition. For anomaly avoidance on an HTRW site with known or suspected UXO, the contractor will provide a team consisting of a minimum of two personnel, one of whom must be a qualified UXO Technician II or above. This individual will be the team leader. The team must be on-site during all sampling activities. The team may include additional UXO qualified personnel, depending on site and task specific conditions/requirements. A description of the qualifications for contractor UXO personnel is provided on the OE MCX website at http://www.hnd.usace.army.mil/oew.

5-3. Responsibilities. The team members have the following responsibilities for anomaly avoidance procedures during an HTRW investigation project on a site with known or suspected UXO:

a. Prepare a Work Plan to supplement the prime contractor's or USACE Work Plan/Site Plan as described in Chapter 3.

b. Provide the explosive ordnance recognition, location, and safety functions for the prime contractor during HTRW sampling activities.

c. Conduct UXO safety briefings for all site personnel and visitors.

5-4. Authority. The senior UXO qualified person has final on-site authority on OE matters.

5-5. Access Surveys. The team must conduct a surface access survey and a subsurface survey for anomalies before any type of activities commence, including foot and vehicular traffic.

a. HTRW sampling personnel must be escorted by UXO qualified personnel at all times in areas potentially contaminated with UXO until the team has completed the access surveys and the cleared areas are marked. Escorted HTRW personnel will follow behind the UXO escort. If anomalies or UXO are detected, the UXO escort will halt escorted personnel in place, select a course around the item, and instruct escorted personnel to follow.

b. The team will conduct an access survey of the footpath and/or vehicular lanes approaching and leaving HTRW sampling areas with known or suspected UXO contamination. The access route shall be at least twice as wide as the widest vehicle that will use the route.

c. The Team must also complete an access survey of an area around the proposed investigation site that is large enough to support all planned operations. The size of the surveyed area will be site-specific and will take into account, for example, maneuverability of required equipment (e.g., drill rigs, excavation equipment, etc.), parking of support vehicles, and establishment of decontamination stations. As a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the longest vehicle or piece of equipment to be brought on-site.

d. Geophysical instrumentation capable of detecting the smallest known or anticipated UXO will be used to locate anomalies just below the surface that may be encountered through erosion from rain or continual vehicular traffic. The various types of geophysical detection equipment are presented in Chapter 4.

e. If anomalies or surface UXO are encountered, they will be marked with flagging and the investigation area will be relocated to avoid contact. The team will clearly mark the boundaries of the surveyed area using survey flagging and pin flags. The team will establish a system of flagging colors that will distinguish anomalies, surface UXO, and route boundaries from each other as well as from any utility markings that have been used at the site.

f. If surface UXO is encountered, the team will assess the condition of the UXO to determine if disposal action is required. UXO disposition will follow the procedures in paragraph 5-12.

g. No personnel will be allowed outside of the surveyed areas.

5-6. Surface Soil Sampling. Surface soil samples are normally collected at depths from zero to six inches below ground surface. The following paragraphs describe anomaly avoidance procedures for soil sampling between zero and six inches below ground surface on an HTRW site with known or suspected UXO. Soil sampling at depths greater than six inches below ground surface on an HTRW site with known or suspected UXO will follow the procedures in paragraph 5-9.

a. The team must conduct an access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in paragraph 5-5.

b. The team must visually survey the surface of each proposed surface soil sampling site for any indication of UXO or UXO-related contamination. In addition, the team must conduct a survey of the proposed sample locations using geophysical instrumentation capable of detecting the smallest known or anticipated UXO to a depth of one foot. The various types of geophysical detection equipment are presented in Chapter 4.

c. If anomalies are detected at a proposed sampling location or too many anomalies are detected in a general area of interest, the HTRW personnel will select an alternate location for collection of surface soil samples. Any anomalies detected will be prominently marked with survey flagging or pin flags for avoidance during HTRW sampling activities.

5-7. Passive Soil Gas Sampling. Passive soil gas sampling typically involves excavation of holes to a depth of less than five feet and the installation and subsequent removal of sampling canisters. The following paragraphs describe anomaly avoidance procedures for passive soil gas sampling on an HTRW site with known or suspected UXO.

a. The team must conduct an access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in paragraph 5-5.

b. The team must visually survey the surface of the proposed passive soil gas sampling sites for any indication of UXO or UXO-related contamination. In addition, the team must conduct a survey of the proposed sample locations using geophysical instrumentation capable of detecting the smallest known or anticipated UXO to the specified emplacement depth for the sampling canister. The various types of geophysical detection equipment are presented in Chapter 4.

c. If the emplacement depth is greater than the geophysical instrumentation detection capabilities, then the team must incrementally complete the geophysical survey every two feet while excavating for emplacement of the sampling canisters. Non-essential project personnel should withdraw to a distance of not less than the fragmentation distance of the MPM established for the site during excavation for the incremental geophysical survey.

d. If anomalies are detected at a proposed sampling location or too many anomalies are detected in a general area of interest, the HTRW personnel will select an alternate location for collection of passive soil gas samples. If an anomaly is detected during an incremental geophysical survey, the hole will be backfilled in accordance with site-specific procedures. Any anomalies detected will be prominently marked with survey flagging or pin flags for avoidance.

e. Unless a path is clearly marked, the HTRW sampling personnel must be escorted by UXO qualified personnel when they subsequently return to each soil gas sampling site to retrieve the sampling canisters.

5-8. Active Soil Gas Sampling and Direct Push Technology. Active soil gas sampling typically involves manual or mechanical penetration at the desired location followed by withdrawal and collection of a soil gas sample. Direct push technology (DPT) is a common method for mechanical penetration during active soil gas sampling. The following paragraphs describe anomaly avoidance procedures for active soil gas sampling and use of DPT on an HTRW site with known or suspected UXO.

a. The team must conduct an access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in paragraph 5-5.

b. Active soil gas sampling and DPT installations will follow the same anomaly avoidance procedures as outlined below for soil boring and monitoring well installations. The actual sampling will occur through the pilot hole or a boring located within a two-foot radius of the pilot hole installed by the team. If the pilot hole cannot be used to obtain a representative soil gas sample, it must be backfilled in accordance with site-specific procedures prior to installation and sampling of the soil gas sampling point. The backfilling of the pilot hole should be performed to prevent the soil gas sampling from being diluted by atmospheric air that may be drawn in through the pilot hole. Following collection of the soil gas sample, the sampling location must be backfilled in accordance with site-specific procedures.

5-9. Subsurface Soil Sampling and Monitoring Well Installation. Subsurface soil sampling is defined as the collection of samples below a nominal depth of approximately six inches from a split-spoon, Shelby tube, or bucket auger soil sampler using drilling techniques. Drilling techniques are also used to install groundwater monitoring wells for HTRW investigative sampling. The following paragraphs describe anomaly avoidance procedures for subsurface soil sampling and monitoring well installations on an HTRW site with known or suspected UXO.

a. The team must conduct an access survey of the routes to and from the proposed investigation site as well as an area around the investigation site, as described in paragraph 5-5.

b. The team must complete a subsurface geophysical survey of the proposed drill hole location(s). If an anomaly is detected, HTRW sampling personnel must select a new drill hole location. Any anomalies detected will be prominently marked with survey flagging or pin flags for avoidance. If the subsurface sampling or well installation depth is greater than the geophysical instrumentation detection capabilities, the team must incrementally complete the geophysical survey as outlined below.

(1) Underground Utilities. Utility clearance and/or excavation permits, if required, must be obtained prior to the commencement of any incremental subsurface geophysical survey activities by the team. The team is responsible for verifying that all necessary excavation permits are on-site prior to commencing operations. The prime contractor is responsible for contacting the appropriate agency(ies) or company(ies) to mark the location of all subsurface utilities in the construction area. All located utilities should be marked by paint, pin flags, or other appropriate means to visually delineate their approximate subsurface routing. The color shall not conflict with the colors used in UXO activities. In the event subsurface utilities are suspected in an excavation area, the team must attempt to verify their location. The team should be aware that not all utility lines will be detectable with geophysical equipment (i.e., not all utility lines are constructed of ferrous material).

(2) Pilot Hole/Incremental Geophysical Survey. Once an access survey has been completed, the team will install a pilot hole at each proposed drill hole location. During installation of the pilot hole, non-UXO qualified personnel should withdraw to a distance of not less than the fragmentation distance of the MPM established for the site.

(a) The pilot hole will be installed using a manual or mechanical portable auger. During installation of the pilot hole, a geophysical instrument configured for down-hole utilization will be used to inspect for anomalies every two feet.

(b) If an anomaly is detected, the pilot hole will be backfilled in accordance with site-specific procedures and HTRW sampling personnel must select a new drill hole location. Any anomalies detected will be prominently marked with survey flagging or pin flags for avoidance.

(c) As long as no anomalies are detected, the pilot hole will be advanced to the maximum reach of the auger or to the maximum depth of the proposed drill hole, whichever is less. The pilot hole will also be inspected upon reaching the final depth, providing a total clearance depth equal to the pilot hole depth plus two feet. If no anomalies are detected to the total depth of the proposed drill hole, the drill rig may be brought on-site and utilized.

(d) In cases where the pilot hole does not reach the full depth of the proposed boring (e.g., the proposed depth of the drill hole is more than the maximum depth of the auger or the team cannot penetrate the soils using the auger), the drill rig may be brought on-site and advanced in two-foot increments beyond the clearance depth of the pilot hole. At the end of each two-foot increment, the drill rig's augers must be withdrawn from the hole so that the team may screen for anomalies as described above. As necessary with loose soils, a polyvinyl chloride (PVC) pipe (minimum 3 inches inner diameter) may be inserted to keep the hole open and to allow for incremental geophysical screening.

(e) Incremental screening may be discontinued once the drilling has extended to depths greater than 30 feet below ground surface, a geologist determines that virgin soil is found, or the

depth of penetration is exceeded, whichever is greater. All pilot holes will be backfilled in accordance with site-specific procedures.

(3) Monitoring of Drilling by Others. Once the team determines that a proposed drill hole location is free of anomalies using the procedures described above, the drilling contractor will be notified that the site is available for subsurface sampling or monitoring well installation.

(a) The drilling contractor's actual drill hole must be located within a two-foot radius of the pilot hole installed by the team. While this proximity to the pilot hole may affect the accuracy of "blow counts" for the HTRW team, anomaly avoidance takes precedence.

(b) Any drilling beyond the clearance depth of the pilot hole will be conducted in two-foot increments to allow the team to screen for anomalies. In order to avoid magnetic interference from the augers, the drill rig must withdraw its augers from the hole for the geophysical survey. As necessary with loose soils, a PVC pipe (minimum 3 inches inner diameter) may be inserted to keep the hole open and to allow for incremental geophysical screening. Drilling equipment and/or metallic support materials (e.g., drill rig, augers, drill rods, casings, etc.) may create an interference affecting the operation of the geophysical survey instrumentation during the incremental inspection process. In such an event, the item(s) creating the interference must be relocated outside the interference range of the geophysical instrument during each incremental inspection of the drill hole. If an anomaly is detected, the drill hole will be backfilled in accordance with site-specific procedures and HTRW sampling personnel must select a new drill hole location.

(c) Incremental screening may be discontinued once the drilling has extended to depths greater than 30 feet below ground surface, a geologist determines that virgin soil is found, or the depth of penetration is exceeded, whichever is greater.

5-10. Test Pit and Trench Excavations. Test pits and trench excavations are used to identify and characterize large subsurface HTRW areas of concern. The following paragraphs describe anomaly avoidance procedures for test pit and trench excavations on an HTRW site with known or suspected UXO.

a. The team must conduct an access survey of the routes to and from the proposed investigation site as well as an area around the investigation site as described in paragraph 5-5.

b. The team must complete a subsurface geophysical survey of the proposed excavation locations. If an anomaly is detected, HTRW sampling personnel must select a new excavation location. Any anomalies detected will be prominently marked with survey flagging or pin flags for avoidance. If the proposed excavation depth is greater than the geophysical instrumentation detection capabilities, the team must incrementally complete the geophysical survey as outlined below.

(1) Underground Utilities. The procedures outlined in paragraph 5-9b(1) will be followed.

(2) Excavation Procedures. Once an access survey has been completed, HTRW personnel may begin excavation in two-foot increments. During excavation, personnel not directly involved in the excavation activities should withdraw to a distance of not less than the fragmentation distance of the MPM established for the site.

(a) At the end of each two-foot increment, the team will screen for anomalies. If an anomaly is detected, HTRW sampling personnel must modify the excavation location to avoid the anomaly. Any anomalies detected will be prominently marked with survey flagging or pin flags for avoidance.

(b) If UXO is uncovered in an excavation, all operations will cease. The team will assess the condition of the UXO to determine if disposal action is required. UXO disposition will follow the procedures in paragraph 5-12. Once UXO has been encountered in an excavation, no further excavation is allowed at that location until EOD has removed the UXO item. Once the item is removed, excavation may continue using anomaly avoidance techniques. The After Action Report will indicate that UXO was encountered and summarize resulting activities.

c. Waste and/or Other Materials Encountered. In the event potentially hazardous waste, debris, or drums are encountered during test pit or trenching operations, excavation activities will cease. The HTRW Site Safety and Health Officer (SSHO) will assess the situation and may direct a change to the PPE for site workers. The SSHO will notify the appropriate personnel in accordance with the site-specific work plan. Wastes will be handled in accordance with the site-specific investigation-derived waste (IDW) management plan.

5-11. Groundwater Monitoring/Aquifer Characterization. Groundwater monitoring activities include measurement of groundwater elevations, measurement of free product thickness, and collection of analytical samples. Groundwater monitoring wells may also be used for aquifer characterization activities (e.g., slug tests). Unless a path is clearly marked, the HTRW sampling personnel must be escorted by UXO qualified personnel as described in paragraph 5-5a when they subsequently return to conduct groundwater monitoring/aquifer characterization activities.

5-12. UXO/OE Disposition. Since the purpose of UXO support during HTRW activities is anomaly avoidance, the team is not tasked to perform UXO/OE disposition. UXO/OE disposition will not be covered in the planning documents for the project, and therefore the team is not capable or equipped to perform UXO/OE disposition. In the event that ordnance is encountered that cannot be avoided or, based on its fuzing or current condition, presents an imminent hazard requiring immediate attention, the team will notify the local POC designated in the Work Plan. The team will not destroy any of the UXO encountered. The local POC will notify the appropriate authority of the UXO discovery and the team will safeguard the site pending arrival of the appropriate authority.

a. On active installations, UXO disposition requests will normally require reporting to the Range Control Officer, Facility Engineer, Post Headquarters or POC designated in the Work Plan.

b. On FUDS, the local POC will facilitate EOD response. If the local POC designated in the Work Plan is not the local law enforcement agency, the local POC will inform the local law enforcement agency of the discovery. The local POC will also contact the USAESCH Safety Manager.

5-13. Quality Management. HTRW Design Districts should include anomaly avoidance capability in all applicable indefinite delivery order contracts for HTRW reports, designs, or remedial actions on FUDS or active military sites. UXO/OE concerns must be addressed before initiating any HTRW field investigation activities. Prior to initiation of on-site activities, items developed for UXO support of HTRW activities (i.e., SOW and Work Plan) must be submitted to the appropriate OE Design Center and the OE MCX for review in accordance with the roles and responsibilities set forth in Chapter 1. The executing district is responsible for supervising the fieldwork and ensuring compliance with all approved plans by all USACE and contractor personnel. The OE MCX may also conduct random inspections to verify conformance. A separate on-site, full-time UXO Quality Control Specialist (UXOQCS) is not required for UXO support activities. However, the UXO support contractor must perform quality control reviews of all field activities. Upon completion of the UXO support activities, the PM will ensure an After Action Report is submitted to the OE MCX.

CHAPTER 6
UXO SUPPORT DURING CONSTRUCTION ACTIVITIES

6-1. Introduction.

a. This chapter discusses procedures for UXO support during construction activities (including construction activities related to remedial actions) on sites with known or suspected UXO. The purpose of UXO support during construction activities is to reduce the potential for exposure to UXO.

b. UXO support during construction activities may require only UXO safety support or a complete UXO subsurface clearance response, depending on an assessment of the probability of encountering UXO and the level of confidence associated with the determination.

(1) If the probability of encountering UXO is low (e.g., current or previous land use leads to an initial determination that UXO may be present), only UXO safety support will be required. UXO safety support is discussed in paragraph 6-5.

(2) When a determination is made that the probability of encountering UXO is moderate to high (e.g., current or previous land use leads to a determination that OE was employed or disposed of in the area of concern), UXO qualified personnel must conduct a subsurface clearance of the known construction footprint and remove all discovered UXO.

(3) The level of effort for construction support is site/task-specific and will be determined on a case-by-case basis by the project team in coordination with the OE MCX.

c. When a determination is made that the probability of encountering UXO on a construction site is moderate to high (i.e., a subsurface clearance of the known construction footprint will be conducted), an OE Safety Specialist will be on-site to provide safety oversight. When a determination is made that the probability of encountering UXO on a construction site is low, (i.e., only UXO safety support is required), an OE Safety Specialist is generally not required on-site. Additional details are available in ER 1110-1-8153.

6-2. UXO Team Composition.

a. General. For construction activities on sites with known or suspected UXO, the contractor will provide a UXO team consisting of a minimum of two qualified UXO personnel (one UXO Technician III and one UXO Technician II). The UXO team may include additional UXO qualified personnel, depending on site and task specific conditions/requirements. The number of UXO teams will vary depending upon the total level of effort. A description of the qualifications for contractor UXO personnel is provided on the OE MCX website at http://www.hnd.usace.army.mil/oew.

b. If subsurface clearance is required in support of construction activities (i.e., there is a moderate to high probability of encountering UXO), the UXO team(s) must also meet the following standards:

(1) Each UXO team will not include more than six team members in addition to the UXO Technician III.

(2) A Senior UXO Supervisor (SUXOS) will be on-site and will not supervise more than 10 UXO Technician IIIs. There will not be more than one SUXOS per project without prior approval from the Contracting Officer.

(3) The position of UXOSO will be required on all subsurface clearance projects in support of construction activities; however, the positions of UXOSO and UXOQCS may be dual-hatted when there are less than 15 personnel on site.

(4) A UXOQCS may not be required full-time on-site. However, quality control functions will be performed for all field activities.

6-3. Responsibilities. The UXO team members have the following responsibilities for UXO support during construction on a site with known or suspected UXO:

a. Prepare a Work Plan and ESS (if required) to supplement the prime contractor's or USACE Work Plan/site plan as described in Chapter 3.

b. Provide the explosive ordnance recognition, location, and safety functions for the prime contractor during HTRW sampling activities.

c. Conduct UXO safety briefings for all site personnel and visitors.

6-4. Authority. The OE Safety Specialist has final on-site authority on OE safety matters. If an OE Safety Specialist is not present on-site, the UXO supervisor has final on-site authority for OE matters.

6-5. Safety Support.

a. Safety support is required for construction activities on sites with known or suspected UXO if the probability of encountering UXO is low.

b. The UXO team should review any archival information available regarding the area of the proposed construction activities. If possible, the UXO team should determine the probable types of UXO that may be encountered and specific safety considerations. The UXO team should meet with on-site management and construction personnel and conduct a general work and safety briefing, including:

(1) Probable site hazards and site-specific safety considerations.

(2) UXO safety support procedures.

(3) Responsibilities and lines of authority for any UXO-related response.

(4) Emergency response procedures.

c. The UXO team should physically preview the actual construction footprint with the on-site management of the construction contractor and discuss visual observations and potential areas of concern. In the event surface UXO is discovered, the UXO team will place flagging adjacent to the discovery for subsequent visual reference, select a course around the item, and lead any on-site personnel out of the area. The UXO team will assess the condition of the UXO to determine if disposal action is required.

d. The UXO team should monitor all excavation activities in areas potentially contaminated with UXO. One member of the team should be positioned to the rear and upwind of the excavation equipment for continuous visual observation of activities. If the construction contractor unearths or otherwise encounters suspect UXO, all excavation activities will cease. The UXO team will assess the condition of the UXO to determine if disposal action is required. Once UXO has been encountered in an excavation, no further excavation is allowed at that location until EOD has removed the UXO item. Once the item is removed, excavation may continue. The After Action Report will indicate that UXO was encountered and will summarize resulting activities.

e. The UXO team is generally not tasked to perform UXO/OE disposition activities during safety support of construction activities. If UXO is encountered that requires disposal, the procedures outlined in paragraph 5-12 of this pamphlet will be followed.

6-6. Subsurface Clearance in Support of Construction Activities.

a. A subsurface clearance of the identified construction footprint is required when the probability of encountering UXO during construction-related excavation activities is moderate to high.

b. The subsurface clearance process requires close coordination among on-site management personnel of the USACE, construction contractor, and UXO contractor. The UXO team should physically preview the actual construction footprint with other on-site management personnel and discuss visual observations and potential areas of concern.

c. A surface clearance may be required to remove any existing UXO from the surface of the work area prior to proceeding with subsurface clearance activities. All UXO-related remnants, target materials, and non-UXO related materials which may interfere with a subsurface

geophysical survey should also be removed from the surface of the work area and staged for later disposition. Surface clearance activities will be performed by the UXO team.

d. Safety Considerations.

(1) Subsurface clearance actions must be accomplished in strict accordance with the accepted Work Plan, SSHP, ESP, and ESS (if required). The UXO team should review any archival information available regarding the area of the proposed construction activities and, if possible, determine the probable types of UXO that may be encountered and specific safety considerations. Prior to commencing subsurface clearance activities, the UXO team should provide a general work and safety briefing to all on-site personnel. This briefing should address the following:

(a) Probable site hazards and site-specific safety considerations.

(b) UXO safety support procedures.

(c) Responsibilities and lines of authority for any UXO-related response.

(d) Emergency response procedures.

(2) Underground Utilities. Utility clearance and/or excavation permits, if required, must be obtained prior to the commencement of any intrusive activities. The UXO team is responsible for verifying that all necessary excavation permits are on-site prior to commencing operations. The prime contractor is responsible for contacting the appropriate agency(ies) or company(ies) to mark the location of all subsurface utilities in the construction area. All located utilities should be marked by paint, pin flags, or other appropriate means to visually delineate their approximate subsurface routing. The color shall not conflict with the colors used in UXO activities. In the event subsurface utilities are suspected in an excavation area, the UXO team must attempt to verify their location. The UXO team should be aware that not all utility lines will be detectable with geophysical equipment (i.e., not all utility lines are constructed of ferrous material).

(3) Exclusion Zones. Exclusion zones must be established in accordance with Chapter 3 for all UXO clearance procedures (i.e., anomaly excavation, access and identification of UXO, UXO recovery, and UXO/OE destruction). During these operations, personnel not directly involved in the specific UXO subsurface clearance task will withdraw to a location outside the exclusion zone.

e. Area Preparation.

(1) Area preparation includes reduction and/or removal of vegetation that may impede or limit the effectiveness of subsurface clearance actions. Vegetation reduction/removal may be accomplished through manual removal, mechanical removal, controlled burning, or defoliation.

Selection of the appropriate land clearing strategy should be based on the type and concentration of vegetation, topography, drainage patterns, terrain and soil conditions, and the level of required environmental and natural resource protection.

(2) Area preparation is not considered a UXO clearance procedure. The UXO escort and anomaly avoidance procedures for access surveys presented in paragraph 5-5 of this pamphlet should be followed.

f. Geophysical Mapping/Analysis.

(1) A subsurface geophysical survey will be conducted to identify and locate all anomalies in the identified construction footprint. The various types of geophysical detection equipment are presented in Chapter 4. Subsurface geophysical surveys may be completed using detection instrumentation with real time or post-processing identification and discrimination techniques. All anomalies should be prominently marked with survey flagging or pin flags for subsequent intrusive investigation.

(2) Subsurface geophysical surveys are not considered a UXO clearance procedure. The UXO escort and anomaly avoidance procedures for access surveys presented in paragraph 5-5 of this pamphlet should be followed.

g. Anomaly Excavation.

(1) Anomaly excavation operations are required to intrusively investigate and identify the source of all anomalies located during completion of the subsurface geophysical survey. During excavation operations, only essential project personnel should be within the exclusion zone. All anomaly excavation operations will comply with the provisions of 29 CFR 1926, Subpart P.

(2) Normally, UXO qualified personnel will manually complete anomaly excavations of less than one foot. If an anomaly is deeper than one foot, earth-moving machinery (EMM) should be used to assist in excavation efforts unless site constraints or accessibility restrict or prohibit use. EMM will not be used to excavate within 12 inches of an anomaly. When an anomaly excavation gets within approximately 12 inches of an anomaly, manual excavation must be used to complete the excavation.

(3) Only UXO qualified members of a UXO team may conduct manual excavation operations. A non-UXO qualified member of the UXO team may operate EMM used to assist in anomaly excavations. If more than one EMM will be used within the same work area, the team separation distances described in Chapter 3 will apply to the EMMs.

(4) After the probable source of the anomaly is identified and removed, an approved geophysical instrument should be used to validate the process. If the geophysical instrument

does not continue to detect an anomaly, then the excavation may be back-filled and restored in accordance with contract requirements.

6-7. UXO Destruction.

a. The Work Plan should include procedures for destruction of UXO recovered during construction activities. Destruction of recovered UXO can take one of three forms: in-place, on-site, and off-site. The decision regarding which technique to use is based on the risk involved in employing the disposal operation based on site-specific characteristics and the nature of the UXO recovered as determined by the UXO team. Additional information on UXO disposal operations can be found in TM 60A-1-1-31, Explosive Ordnance Disposal Procedures.

(1) In-Place Destruction. In-place destruction (blow-in-place) is a technique used when a UXO item cannot be safely moved to an alternate location for destruction. This technique is preferred because it exposes the minimum number of personnel. All in-place destructions will be conducted in a manner that ensures maximum control of the site. When this technique is employed, engineering controls are often used to minimize the blast effects.

(2) On-Site Destruction. If UXO is recovered in close proximity to occupied buildings, it may not be possible to safely destroy the item in place. In this instance, the item may be moved to a remote part of the project site where destruction and disposal can safely take place. When a UXO item is destroyed on-site, engineering controls are often used to minimize the blast effect. Guidance for the on-site destruction of UXO is found in EP 1110-1-17.

(3) Off-Site Destruction. If transported off-site for destruction, the UXO will be transported by either military vehicles or by a qualified UXO contractor. The UXO is typically transported to an active military installation where it can be safely destroyed.

b. Safety. The following safety considerations for UXO destruction should be addressed in the Work Plan.

(1) The UXO team conducting destruction activities will have at least three personnel with a minimum of two UXO qualified personnel: one UXO Technician III and one UXO Technician II. One member of the UXO team must always be located outside the minimum separation distance for intentional detonations to give warning and assist in rescue activities in the event of an accident.

(2) Explosives or accessory equipment that is obviously deteriorated or damaged will not be used.

(3) Blasting caps will be at least a commercial No. 8 or equivalent and, for destruction activities requiring multiple caps, be from the same manufacturer.

(4) Blasting caps must be transported in approved containers and not exposed to direct sunlight.

(5) The explosive end of blasting caps, detonators, and explosive devices will be pointed away from the body during handling.

(6) Blasting caps will not be buried. Detonating cord will be used to position blasting caps above the ground.

(7) Electric blasting caps must be tested for continuity prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be short-circuited by twisting the bare ends of the wires together.

(8) In the event of an electric misfire or non-detonation, the UXO destruction site must not be approached for at least 30 minutes. The wait time for nonelectric procedures will be 60 minutes plus the burn time for the fuse. A post-search of the detonation site must be conducted to ensure complete UXO destruction and to ensure that no fires have started.

c. Transport.

(1) Existing site conditions may require that UXO that has been certified as safe-to-ship in accordance with Technical Bulletin (TB) 700-2, DOD Ammunition and Explosives Hazard Classification Procedures be transported to a designated UXO destruction location either on or off the project site.

(2) A Transportation Plan detailing the route and procedures to be used during the transportation of the UXO must be prepared and accepted prior to engaging in any transport activities to ensure that all safety aspects of the movement have been addressed. The transport of UXO off-site must be performed in accordance with the provisions of 49 CFR Part 172; DA Pamphlet (DA Pam) 385-64, Ammunition and Explosives Safety Standards; and applicable state and local laws. Contractor personnel who, by contract requirement, are tasked with the responsibility of transporting or preparing shipments of OE over public roads must meet all training requirements of 49 CFR Part 172 and applicable state requirements.

(3) Safety. UXO items should only be transported from the discovery location to an alternate destruction location as a last option. Armed fuzes must only be transported when absolutely necessary and when all other avenues for in-place disposal have been exhausted. Safety considerations for the transport of UXO include the following:

(a) UXO packaging designs must provide an appropriate container with appropriate blocking and bracing to prevent migration of the hazardous filler. Padding should also be added to protect any exposed filler from heat, shock, and friction.

(b) Base-ejection type projectiles must be transported with the base oriented to the rear of the vehicle and the projectile secured.

(c) Incendiary loaded munitions should be placed on a bed of sand and covered with sand.

(d) Loose pyrotechnic, tracer, flare, and similar mixtures should be placed in #10 mineral oil or equivalent.

(e) White phosphorus filled munitions should be immersed in water, mud, or wet sand.

(4) Manifest. A Hazardous Waste Manifest (Environmental Protection Agency [EPA] Form 8700-22) is required when transporting OE over public roads in non-emergency situations. In emergency situations, military EOD will respond. For informational guidance on the Hazardous Waste Manifest, refer to 49 CFR 172.205 and 40 CFR 262.20. For the purposes of transportation and storage, OE will be hazard classified in accordance with TB 700-2. Government personnel who are tasked to sign shipping papers (including the Hazardous Waste Manifest, if required), must be trained and be given signature authority by their agency in accordance with the requirements of DOD 4500.9-R, Defense Transportation Regulation, Part II, Cargo Movement.

d. Explosives Management.

(1) Explosives used for the destruction of UXO must be acquired and managed in accordance with applicable federal, state, and local laws and regulations including, but not limited to, the following:

(a) Bureau of Alcohol, Tobacco, and Firearms Publication (ATF P) 5400.7, Alcohol, Tobacco, and Firearms Explosives Laws and Regulations, and 27 CFR.

(b) DOD 6055.9-STD.

(c) 49 CFR.

(d) 29 CFR 1910 and 1926.

(2) Acquisition. Explosives may only be purchased under a User of High Explosives License issued by the ATF. The license holder must provide written authorization designating the individuals authorized to purchase, store, or utilize explosives. This letter must specify the name, home address, date and place of birth, and the social security number of the designated individual(s). A copy of the letter must be maintained at the project office. In addition, the designated individual purchasing explosives may also be required to have a Blaster's License issued by the state in which the project is located. Explosives must be purchased from an ATF

licensed commercial distributor. The license holder must provide the distributor a certified statement of the intended use of the explosive material.

e. Temporary Explosives Storage Facilities on FUDS.

(1) When the contractor must establish temporary storage for explosives on FUDS, type 2 magazines conforming to the standards set forth in Section 55.206 of ATF P 5400.7 must be used. The location of the proposed magazines and the Q-D arcs must be shown on a site map attached to the ESP. The Q-D arcs must be based on the NEW established for each magazine and are derived using Table C9.T1, DOD 6055.9-STD. In the event that existing site conditions prohibit the siting of the magazines in conformance with derived Q-D arcs and the NEW cannot be reduced to achieve conformance, the PM must request assistance in the design of engineering controls or structural modifications necessary to bring the magazine within Q-D stated criteria.

(2) Explosives and initiators must be stored separately. If magazines are also used to temporarily store safe-to-ship UXO, each UXO item must be stored in accordance with its appropriate HD and the storage compatibility group criteria listed in Chapter 3, DOD 6055.9-STD. Each magazine must display the placards required by Department of Transportation (DOT) regulations 49 CFR Part 172, Subpart F for the HD of UXO or explosives stored in the magazine.

(3) Lightning protection is not required for magazines to be located on FUDS if all of the following criteria are met:

(a) The magazine is constructed of 3/16-inch thick steel or greater.

(b) The magazine is properly grounded.

(c) The magazine is located at least 6.5 feet from the nearest fence.

f. Temporary Storage Facilities on Base Realignment and Closure (BRAC) Sites/Active Installations.

(1) Temporary storage facilities for projects on BRAC sites or active installations must be determined using the installation’s criteria.

(2) Lightning protection for temporary storage facilities to be located on BRAC sites or active installations must meet the provisions of DOD 6055.9-STD.

g. Security.

(1) The Work Plan should describe the inventory control system to be implemented for explosives management. Magazine Data Cards documenting explosive transfers for each

magazine must be completed with a copy maintained within the associated magazine. Explosives issued and unexpended must be returned to the magazine at the end of each workday.

(2) The inventory control system must include provisions for the physical inventory of the stored UXO and explosives at least weekly. Actual quantities must be reconciled with the quantities annotated on the corresponding Magazine Data Cards. Any discrepancies must be immediately reported to the USACE representative and an audit initiated to determine the source of the discrepancy.

(3) A physical security survey should be conducted to determine if fencing or guards are required when temporary storage facilities must be established. Generally, a fence around the magazines is needed, but the contractor is responsible for determining the degree of protection required to deter the theft of UXO or explosives stored in the magazines.

(4) Locks used on magazines at a FUDS will meet the standards listed in Section 55.208 (a) (4), ATF P 5400.7. BRAC and Installation Restoration site requirements must be determined using the installation's service criteria. A key control system should be documented in the Work Plan.

h. Fire Prevention. A Fire Prevention Plan should be prepared and coordinated with the appropriate fire department with primary response responsibility. Fire extinguishers of an appropriate size and type must be located at all temporary explosives storage facilities.

i. Records. Records must be maintained for all transactions and expenditures of explosive materials for a period of five years from the date of transaction in compliance with ATF regulations. These records must be maintained at the project office during on-site operations and subsequently at the business office of the ATF license holder.

j. Debris/Remnant Management. The Work Plan must include operational and quality control procedures for the processing, demilitarization, and disposition of inert ordnance, target materials, and UXO-related remnants which fall within the classification of Ammunition, Explosives, and Dangerous Articles (AEDA). Contact the OE MCX for the requirements on AEDA processing and disposition.

6-8. Quality Management.

a. Quality Control.

(1) The UXO team is responsible for the quality control (QC) of all surface and subsurface clearance activities and ensuring that only those procedures and processes conforming to contractual requirements and accepted project plans are implemented. The UXO team will develop a Quality Control Plan (QCP) outlining the quality activities to be used for continually assessing the implementation, effectiveness, compliance, and adequacy of operations.

(2) A separate UXOQCS is not required on-site full-time for UXO support activities. However, the UXO support contractor must perform QC reviews of all field activities in accordance with the accepted QCP.

(3) The QCP should provide procedures for validation of the following:

(a) Surface clearance and related activities are conducted in accordance with accepted project plans.

(b) Subsurface clearance and related activities are conducted in accordance with accepted project plans.

(c) Actual probabilities of detection are consistent with clearance reliability levels and USACE and DDESB requirements.

(d) Subsurface clearance operations provide for an adequate level of confidence of UXO detection and removal to specified depths.

(e) Disposition of UXO and materials classified as AEDA has been completed and documented. Procedures are available from the OE MCX.

b. Quality Assurance (QA).

(1) Districts should include UXO support capability in all applicable contracts for construction activities on FUDS or active military sites. UXO/OE concerns must be addressed before initiating any construction activities. Items developed for UXO support of construction activities (i.e., SOW, Work Plan, SSHP, ESP, and ESS, if required) must be submitted to the OE MCX for review and approval in accordance with the roles and responsibilities set forth in Chapter 1 of this pamphlet prior to initiation of on-site activities.

(2) The district is responsible for supervising the field work and ensuring contractor compliance with all accepted plans. The OE MCX may also conduct random inspections to verify conformance. Upon completion of the UXO support activities, the PM will ensure an After Action Report is submitted to the OE MCX.

CHAPTER 7
PROCEDURES WHEN SUSPECT CHEMICAL WARFARE MATERIEL IS ENCOUNTERED

7-1. Introduction.

a. This chapter discusses UXO support procedures to be followed when suspect chemical warfare materiel (CWM) is encountered on a project site. Contact the OE MCX for detailed procedures for planning and executing CWM response actions.

b. An item configured as a munition containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through its physiological effects is considered CWM. CWM also includes V- and G- series nerve agent, H- series blister agent, and lewisite in other-than-munition configurations. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include riot control agents, chemical herbicides, smoke and flame producing items, or soil, water, debris or other media contaminated with chemical agent.

c. Soil, water, debris, and other media contaminated with chemical agent is not considered CWM. The procedures described in ER 1110-1-8153 will be followed.

7-2. Response Procedures.

a. Any time suspect CWM is encountered, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two personnel will secure the area to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area.

b. Notification.

(1) On FUDS project sites, the UXO team will notify the local POC designated in the Work Plan. The local POC will facilitiate EOD response and two personnel will secure the site until EOD's arrival. If the local POC designated in the Work Plan is not the local law enforcement agency, the local POC will inform the local law enforcement agency of the discovery. The EOD unit will notify the Technical Escort Unit (TEU) and secure the area until TEU's arrival. After notifying the local law enforcement agencies, the local POC will notify the USAESCH Safety Office to inform them of the actions taken.

(2) On active installations, the UXO team will normally notify the Range Control Officer, Facility Engineer, Post Headquarters or POC designated in the Work Plan.

c. Reporting. Incident reports will be prepared and forwarded in accordance with USACE Supplement to AR 385-40. A POC will be identified in the SSHP to prepare and forward the report.

(1) At FUDS, support for others (SFO), or other support provided for non-DA agencies or internal to USACE, the incident report will be prepared and forwarded by the district. Incident reports will be numbered USACE-UUU-YY-X where “UUU” is the district three letter identifier, “YY” is the last two digits of the fiscal year, and “XX” is the sequence number of the incident.

(2) At BRAC sites, Installation Restoration Program (IRP) sites, SFO, or other project support for DA agencies (outside USACE), the incident report will be prepared and forwarded by the agency supported.